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EVALUATION OF MOUNTAIN PINE BEETLE INFESTATIONS YELLOWSTONE NATIONAL PARK, WYOMING 1972

by

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ABSTRACT

The mountain pine beetle, *Dendroctonus ponderosae* Hopk., infestation advanced north and eastward from the 1971 infestation boundary in Yellowstone National Park. Infested trees were found in Indian Creek Campground at the north end of the park and around the north end of Yellowstone Lake. A ground survey showed an average of 15.5 infested trees per acre. A decrease in number of infested trees occurred in older infestation centers in the southwest corner of the park. The infestation will continue at epidemic status in areas containing susceptible stands.

INTRODUCTION

Yellowstone National Park has suffered periodic infestations of mountain pine beetle, *Dendroctonus ponderosae* Hopk., in stands of lodgepole pine, *Pinus contorta* Dougl., and whitebark pine, *Pinus albicaulis* Engelm., since the late 1920's. Small infestations in whitebark pine occurred on Mount Washburn and Dunraven Pass in 1925. Approximately 2,930 lodgepole pine were chemically treated in the Bechler River area in 1930. A serious infestation prompted chemical

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treatment of about 5,500 whitebark pine on Mount Washburn during 1933-34. Beetle populations remained endemic through the 1940's and early 1950's with only occasional scattered mortality occurring in whitebark and lodgepole pine stands. In the late 1950's and early 1960's chronic mortality in whitebark pine occurred on Mount Washburn as well as small infestations in lodgepole pine near the south entrance Ranger Station.

Lodgepole and whitebark pine stands have undergone severe attack by the mountain pine beetle since 1966 throughout the southwestern one-third of the park. The infestation continued its north and eastward spread with isolated attacks in lodgepole pine in the Indian Creek Campground in the northern area of the park, and western boundary north of West Yellowstone. A new infestation was also detected in whitebark pine stands on Mount Washburn and in the Apollinaris Spring area (Fig. 1).

In 1972, a distinct decrease in number of infested lodgepole pine was noted in the southwest corner of the park, where heavy losses have occurred since 1966. The most severe mortality was in whitebark pine stands on the Madison and Pitchstone Plateaus. The infestation in Yellowstone Park now extends over 500,000 acres of mixed lodgepole and whitebark pine stands.

METHODS

Surveys were initiated in 1971 to inventory losses resulting from mountain pine beetle. Fifteen 1-square-mile blocks were selected to measure volume loss and number of trees killed per acre (Table 1). Within each block, variable plots were located at 5-chain intervals on three lines forming a triangle in each block. A wedge prism (BAF = 10) was used to tally trees in plots. Trees occurring in each plot were recorded by species, diameter at breast height (d.b.h.), total height was estimated, and they were classified into one of the following categories:

0 - green, uninfested.
1 - attacked in 1972; green foliage, brood in cambium.
2 - attacked in 1971; red foliage, brood emerged.

A modified Region 1 sale-cruise program was used to analyze the data. A total of 9,600 acres were surveyed (Fig. 1).

RESULTS

In areas surveyed, the coniferous stand is composed of 66.4 percent lodgepole pine, 17.9 percent subalpine fir, *Abies lasiocarpa* (Hook) Nutt., 9.1 percent Engelmann spruce, *Picea engelmannii* Parry, and 6.3 percent whitebark pine.

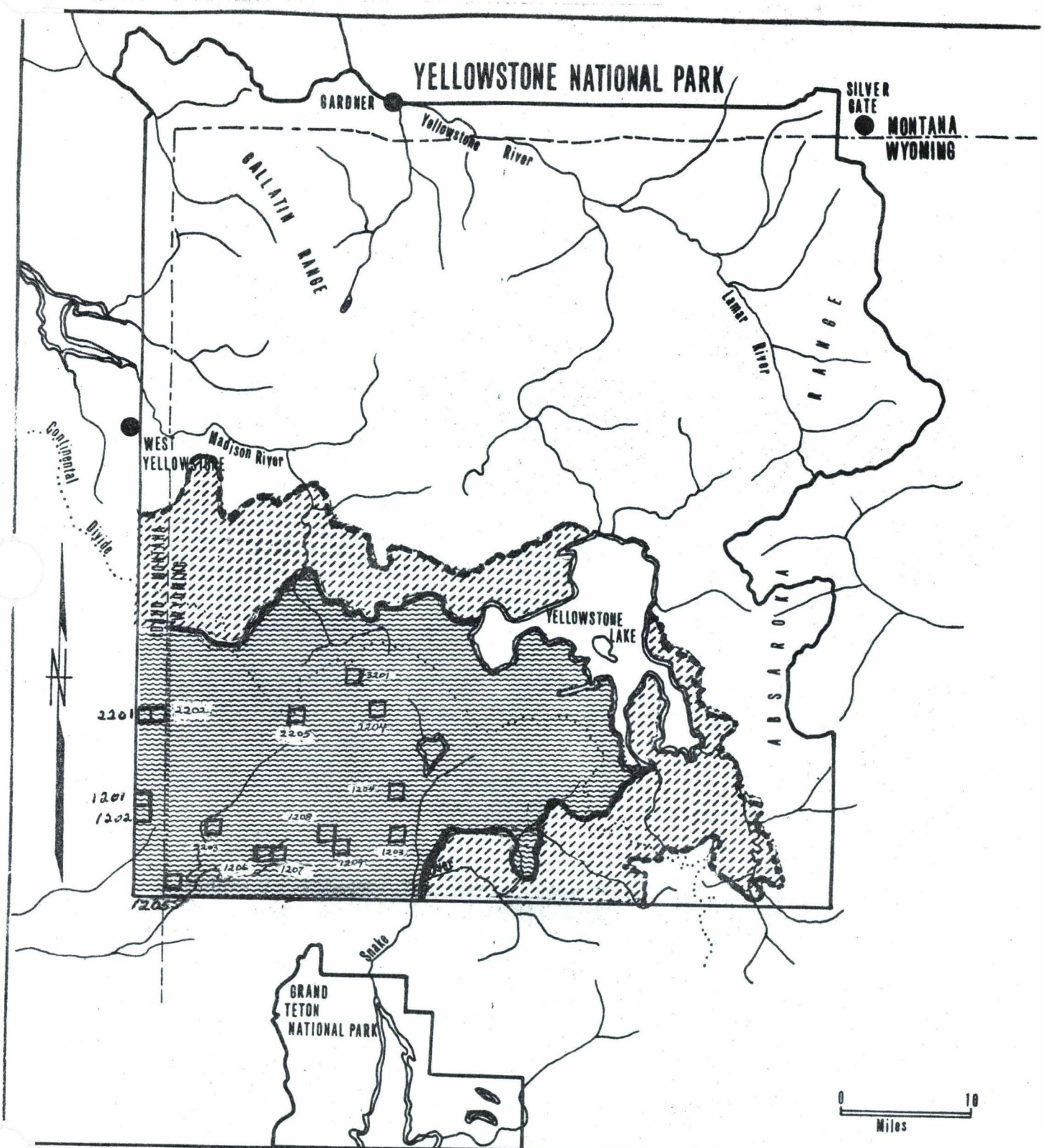

Figure 1.--Mountain pine beetle infestation boundary, Yellowstone National Park

1971

1972

Location of blocks surveyed for mountain pine beetle, 1972.

The mountain pine beetle reduced the average green lodgepole pine diameter from 8.0 inches d.b.h. in 1971 to 6.0 inches d.b.h. in 1972. Approximately 161.0 green lodgepole pine over 5 inches in diameter still remain per acre in the stand.

In the 15 blocks surveyed, a total of 335,597 lodgepole pine were killed during 1971-72, with a volume loss of 29,123,169 board feet; and approximately 3,753 whitebark pine were killed with a volume loss of 458,682 board feet.

The average d.b.h. of infested lodgepole pine was 12.0 in 1971, and 11.0 in 1972. The remaining green lodgepole pine averages 6.0 inches d.b.h.

An average of 19.5 lodgepole pine were killed per acre in 1971 and 15.5 in 1972. About 7 percent of the lodgepole pine was killed in 1971, and another 6 percent in 1972.

Table 1.--Lodgepole pine killed per acre in blocks surveyed in Yellowstone National Park, 1971-72.

Survey block		Trees killed per acre	
		1971	1972
Snow Butte	(1201)	17.3	14.2
Robinson Creek	(1202)	21.0	11.7
Bechler Canyon	(2203)	34.2*	27.0
Bechler St.	(1205)	46.3	22.3
Mountain Ash Creek	(1206)	30.1	13.1
Union Falls	(1207)	54.5	38.6
Pitchstone Plateau	(1208)	10.7*	3.6*
Beulah Lake	(1209)	13.7*	11.7*
Douglas Knob	(2205)	7.1	2.8
Phantom Trail	(1204)	8.6*	7.1
Polecat Creek	(1203)	13.0	26.0
Buffalo Cabin	(2201)	9.3	24.0*
Buffalo Lake	(2202)	11.2	10.2
Shoshone Cabin	(3201)	5.0	8.1
Shoshone Lake	(2204)	12.4	13.4

*Includes whitebark pine.

DISCUSSION

The mountain pine beetle caused significant tree mortality resulting in stand depletion up to 47.0 percent of trees 5 inches and larger in diameter during the past 3 years in some areas of Yellowstone National Park.

Losses have been high; however, the infestation appears to be decreasing due to a reduction in larger diameter host trees.

Continued heavy tree mortality can be expected along the north and east forefront of the infestation where green stands are being infested and in many heavy public use areas in the vicinity of Yellowstone Lake.